Using the PubMed Searches on the OPHS Website

An Instructional Guide

Help!

Created by the Ontario Public Health Libraries Association
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Members of the Ontario Public Health Libraries Association (OPHLA) held a series of working sessions over a period of 4 months to create over 130 literature search strategies that would retrieve journal articles relevant to the content of the Ontario Public Health Standards (OPHS). Search strategies were developed to support the sections of the OPHS not explicitly governed by protocols. These search strategies have been hyperlinked to the PubMed database.

A complete list of the literature searches organized by subject is available in the General Resources section of the OPHS website under the heading Literature Searches.

When you click on the hyperlinked title of a search, predetermined keywords and subject headings (the “search strategy”) are automatically sent to the PubMed database and a list of search results is generated. These searches are “live” in that they are refreshed and updated every time you click on them. You may see more articles today than you did yesterday if new articles which match your search criteria have been added to the database since the last time you clicked on the search. This mechanism ensures that the body of research retrieved by the search remains up to date.

This guide will provide you with basic information about:

- PubMed;
- Limitations of the searches;
- Customizing searches to suit your needs;
- Systematic reviews; and
- Obtaining full text articles.
PubMed Overview

PubMed is a free bibliographic database which is maintained by the US National Library of Medicine. It is accessible at the following URL:


Although PubMed is primarily a biomedical database, it also incorporates allied health and nursing components. At present there are over 15 million citations in the database.

PubMed was selected as the most appropriate database for this project for four important reasons:

1. It is freely available on the Internet, with no subscription or registration required;

2. It is one of the largest and most well-regarded biomedical databases available, indexing thousands of high-impact journals;

3. PubMed’s diverse subject coverage can adequately address the multidisciplinary nature of public health; and

4. PubMed is extremely up-to-date. New citations are added to the database on a daily basis.
What These Searches are NOT

The searches on the OPHS website are not sufficient to support comprehensive literature reviews or systematic reviews. These types of review necessitate a thorough, multi-database search to ensure the retrieval of all relevant literature written on a topic. PubMed is only one of over 150 bibliographic databases of relevance to public health. Others include CINAHL (the Cumulative Index to Nursing & Allied Health Literature), EMBASE (indexes international biomedical literature), and ERIC (the Education Resources Information Centre).

Rather than striving to be comprehensive, these searches provide a selection of current evidence to support the implementation of the requirements in the OPHS. They are suitable for keeping users up-to-date with the latest scientific developments and recently published literature.

There are several current public health initiatives which provide quality-assessed, evidence-based resources for professionals in the field. Some important public health evidence initiatives include:

- Effective Public Health Practice Project (EPHPP)
- health-evidence.ca  
  [http://www.health-evidence.ca](http://www.health-evidence.ca)
- National Collaborating Centres for Public Health.

Governments, agencies, community organizations, and other institutions also produce a wealth of useful information which may not be formally published or indexed in traditional databases. These publications are collectively referred to as “grey literature”. To access this type of information, use search engines and browse online subject directories. To locate grey literature resources which are relevant to public health, see OPHLA’s research tool entitled Public Health Grey Literature Sources. Public health librarians can offer additional expertise conducting more in-depth reviews of research literature on public health topics.
Searching for research literature on any topic is as much an art as it is a science. This is evident in the live searches on the OPHS website. Many key public health concepts from the OPHS are not yet captured by the controlled vocabulary called MeSH (Medical Subject Headings) which is used to index the journal literature in PubMed. The absence of appropriate subject terms to refine a search necessitates use of the less precise technique of searching for key words in the titles and abstracts of articles. This type of searching can produce some false hits and erroneous results. Depending on the topic of the search, some result lists will contain a higher percentage of relevant articles than others. This is normal.

A lower percentage of relevant articles may also be indicative of a lack of published research on that particular public health issue. Also, the algorithm behind the database’s search function ranks the articles by relevancy according to predetermined criteria, and users do not have the option of changing these defaults.

Typically, when you receive a literature search from your library, the librarian has weeded the irrelevant articles before delivering the results to you. In the case of these “live” searches, this weeding is not possible. However, the live searches may be customized to suit individual information needs with a minimal amount of tweaking (i.e. a simple substitution of keywords can narrow, broaden, or re-focus a search, e.g. retrieving information on the prevention of a particular chronic disease rather than general information on chronic disease prevention). For ways to customize your search, see the **Modifying Searches** section on page 12 of this guide.
How to Access a Search

1. Click on the Literature Searches heading in the General Resources section of the OPHS website. Click on the hyperlinked title of any search statement about which you would like to find research evidence. This will automatically run a search in PubMed on your topic.

2. A list of results will open in a new window. Mark articles of interest by clicking on the checkbox beside each citation (A). To view the next page of article citations, click on the Next link in the top right hand corner of the results screen (B). The default number of results displayed on each page will be 50. You can adjust the number of results displayed on each page using the Show: drop down box (C).
Displaying Your Results

The **Display** drop down menu provides a number of options for displaying the citations in the result list.

The three most common display options are:

1. **Summary.** This is the default display option for citations and is ideal for viewing a large number of citations at once. The following fields are displayed in summary mode: author name(s), article title, journal name, volume, issue and page numbers, and unique identifier.
2. **Abstract.** This view displays all fields from the summary option plus the publication type, the author’s affiliated institution(s), and an abstract (summary) for each article.

Longitudinal associations between problem alcohol use and violent victimization in a national sample of adolescents.

**Thompson MP, Sims L, Kingree JB, Windle M.**

Department of Public Health Sciences, Clemson University, Clemson, South Carolina 29634, USA. mphomp@clemson.edu

PURPOSE: Research indicates that alcohol use is both a risk factor for and a consequence of violent victimization. This study investigated the longitudinal associations between problem alcohol use and victimization, and whether these associations varied by gender. METHODS: Data from the National Longitudinal Study on Adolescent Health (Add Health) were used to investigate the prospective associations between alcohol use and victimization over three time points spanning 7 years. Because adolescence is a time of rapid growth, we used latent growth modeling (LGM) in addition to traditional cross-lagged structural equation modeling (SEM). RESULTS: For boys, both SEM and LGM indicated that problem alcohol use was a risk factor for subsequent violent victimization. For girls, the SEM suggested a bi-directional association, although the LGM provided stronger support for problem alcohol use as a risk factor for, rather than a consequence of, violent victimization. CONCLUSIONS: Findings across the two statistical approaches suggest that interventions that reduce the likelihood of problem alcohol use among adolescents can minimize the short-term risk of victimization and the long-term risk of problem alcohol use in young adulthood.

PMID: 18155026 [PubMed - indexed for MEDLINE]

3. **Citation.** This option is similar to the Abstract view, but also displays the assigned MeSH headings for each citation.

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MeSH Terms:
- Adolescent
- Adolescent Behavior/psychology*
- Alcoholism/epidemiology*
- Alcoholism/psychology
- Crime Victims/psychology
- Crime Victims/statistics & numerical data*
- Female
- Follow-Up Studies
- Health Surveys*
- Humans
- Longitudinal Studies
- Male
- Risk Factors
- Sex Distribution
- United States/epidemiology
- Violence/psychology
- Violence/statistics & numerical data*

PMID: 18155026 [PubMed - indexed for MEDLINE]
Sorting Your Results

The **Sort by** drop down menu allows you to sort your search results according to different fields. You can change the order in which the search results are sorted and displayed by selecting an option from this list. You may choose to view the citations by publication date (default), last name of first author, or journal name.

![PubMed interface showing Sort by options](image)

Saving, Printing and Emailing Your Results

The **Send to** drop down menu provides you with a number of options for saving, printing and emailing only those citations that you have selected as relevant. After you have reviewed all of the search results and clicked on the checkboxes next to your desired citations, select one of the options from the **Send to** menu to keep your selected results on file.

![PubMed interface showing Send to options](image)
Related Articles

The Related Articles feature can be a useful strategy for identifying additional related articles on your chosen subject, which will make for a more thorough literature search.

When you click on the blue Related Articles hyperlink in the top right-hand corner of a citation, a list of articles with MeSH headings similar to those of the original article will be displayed.

This function is particularly useful in instances when the original list of search results contains a significant number of erroneous results.
Modifying Searches

If you would like to find research evidence on a topic that is not directly addressed by the searches on the OPHS website, there are several ways that you can modify these existing searches to suit your needs. By using additional search limits to refine your results or substituting a few key search terms in an existing strategy, you can retrieve more relevant results without having to create an entirely new strategy.

Applying Search Limits

The Limits tab in PubMed offers a number of options to help you refine a search strategy. Depending on which limit you choose to apply, you can restrict your search results to a particular type of study (e.g. meta-analysis, clinical trial, etc.), a particular age group (e.g. children 6-12 years of age, the aged, etc.), a particular gender, and many other specifications.

1. Click on the Limits tab located on the grey toolbar above the search query box.
2. You will be redirected to the screen below. Click on the checkboxes beside the limits that you wish to add to your search strategy.

3. Click the GO button at the bottom of the screen to apply the selected limits to your search.

4. Once your limits have been applied, they will be displayed in a yellow bar below the limits tab on the search results page. You will notice that you have fewer results in your list, but they will be much more focused and precise.
Substituting Keywords and MeSH Headings

You can change the focus of a search by making small changes to the search strategy. This technique may require slightly more time to complete successfully, depending on your familiarity with the PubMed database, but it is extremely valuable. For a more in-depth PubMed search tutorial, consult OPHLA’s Introduction to PubMed Searching: A Reference Guide.

One advantage of searching PubMed is that this database allows you to manipulate search strategies easily. To modify a search, follow the steps described below.

1. Click on the Literature Searches heading in the General Resources section of the OPHS website. Click on the hyperlinked search statement of your choice.

2. Click on the Details tab to review key terms and MeSH subject headings used in the initial search strategy.
3. You will be redirected to a page that displays the terms used to create the search strategy. Look for the block of text beneath the heading User query.

4. Highlight this entire block of text, copy it, and then paste it into a Microsoft Word document. This will enable you to easily delete, add, or substitute words in the search strategy.
5. Once you have modified the search strategy, copy the entire new strategy and paste it into PubMed’s search box.

The following example will illustrate in more detail how to substitute keywords and search terms.

Example:

Using the strategy from our search on the surveillance of alcohol and substance misuse, you can build a strategy that will retrieve articles on the effectiveness of community programs to prevent and treat alcohol- and substance misuse-related disorders.

The original search strategy looks like this:

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1. First you would copy the original search strategy from PubMed’s Details section to a Microsoft Word document. From this strategy, you will keep all the alcohol- and
substance misuse-related MeSH terms and keywords (highlighted in grey above) and delete all other terms. You will be left with a string of words that looks like this:


2. Because you are interested in community programs, you will need to add keywords and subject headings to the search strategy which capture this concept. You might add the following keywords to the strategy:

("community programs" OR Community health planning[mh] OR Community health services[mh] OR Community networks[mh] OR Needle exchange programs[mh] OR Preventive health services[mh])

Tip!

You can find relevant subject headings by searching PubMed’s MeSH Database at http://www.ncbi.nlm.nih.gov/sites/entrez?db=mesh. Type keywords into the MeSH search box to retrieve MeSH headings that relate to your topic.

When you add a MeSH heading to your search strategy, it should be immediately followed (no space!) by the following symbol: [mh]

For example: Needle exchange programs[mh]
3. Put these two concepts together using the AND operator. Your NEW search strategy will look like this:

```
AND ("community programs" OR Community health planning[mh] OR Community health services[mh] OR Community networks[mh] OR Needle exchange programs[mh] OR Preventive health services[mh])
```

Keywords and subject headings used to describe a single concept are connected with the OR operator and surrounded by round brackets. All operators such as AND & OR must be CAPITALIZED.

**DO NOT** delete any round brackets ( ) or modify search terms which are followed by the search codes [majr] or [mh] within an existing search strategy. This can dramatically skew the results of your search. In some search strategies, there may seem to be an excessive number of round brackets. However, these search operators are absolutely necessary for “nested” searching, which is a powerful and precise advanced searching capability in PubMed.

4. Finally, you would copy the entire search strategy, paste it into the PubMed search box, and click the Go button.
Systematic Reviews

What is a Systematic Review?

Systematic reviews analyze, synthesize, and summarize virtually all available evidence (often hundreds of research studies) related to a particular topic. To conduct a systematic review, researchers must begin by performing a thorough and systematic literature search using an explicit and judicious search methodology. They must then critically appraise the retrieved literature according to a rigorous proscribed methodology to ensure that it is valid and applicable before including it in their final research synthesis. Selected studies are then subject to techniques such as meta-analysis to combine and cross-analyze their results. The level (or quality) of evidence provided by each study may also be graded, depending on the methodology used.

It can be difficult to distinguish systematic reviews from other kinds of review articles. According to the basic hierarchy of publication types, all review articles are classified together; in essence, a systematic review is a review article. However, not all review articles are created equal. A systematic review is a highly specialized, high-quality type of review article which is conducted according to a rigorous methodology.

However, systematic reviews are not infallible. It is just as important to critically appraise the methodology of a systematic review as it is to appraise any other kind of research study. For more information on critical appraisal, see the Critical Appraisal of Evidence and Research heading in the General Resources section of the OPHS website.

Many health care journals now publish systematic reviews, and most of these journals are indexed in MEDLINE (PubMed). There are also other sources of systematic reviews, some of which are listed in the next section.

The literature searches on the OPHS website do not focus exclusively on systematic reviews. For many public health topics, particularly those which have very recently emerged, systematic reviews have not yet been conducted. A systematic review cannot be completed until a certain number of preliminary studies have been conducted (in other words, there must be published literature available to summarize). If a systematic review limit were applied to certain searches on the OPHS website, no articles would be retrieved. However, the search strategies were constructed in such a way that systematic reviews will be included in the results along with other types of studies.
Finding Systematic Reviews

1. Find reviews within PubMed search results

PubMed allows you to see only the “review articles” in your result set. However, results will include not only systematic reviews but other types of reviews as well (such as less rigorous summaries of a particular topic). To view these review articles, click on the tab called “Review” when you are looking at your search results. Now you will see a list of articles which are “reviews”. Further reading of the methodology will allow you to determine if the article truly is a systematic review or simply a “review article”.

![PubMed search results showing reviews](image-url)
2. Find reviews using the Clinical Queries tool.

PubMed also has a built in systematic review filter. To access it, go to the PubMed homepage at http://www.ncbi.nlm.nih.gov/pubmed/ and select the Clinical Queries option:
You will be taken to the Clinical Queries screen; go to the Find Systematic Reviews section and enter your search terms in the search box.

3. Find reviews by adding a string of key terms to your search statement.

You can use a similar technique to the one described in the “Substituting Keywords and MeSH Headings” section. By adding the systematic review search string shown below to the end of your search statement, you can pull out some review articles on a topic.

Additional Resources for Finding Systematic Reviews

1. Health-evidence.ca

For a free, online registry of screened and appraised systematic reviews relevant to public health practice, see http://www.health-evidence.ca.

2. Cochrane Reviews

Note that Cochrane reviews are indexed in PubMed, so you should find them in your search results. However, you may also go directly to Cochrane to search for systematic reviews. See http://www3.interscience.wiley.com.

For more information about the Cochrane Health Promotion and Public Health Field, see http://www.ph.cochrane.org/en/index.html.

For a listing of reviews relevant to public health, see http://www.ph.cochrane.org/en/newPage2.html.

3. Canadian Best Practices Portal for Health Promotion and Chronic Disease Prevention

This site includes a comprehensive list of sources for systematic reviews relevant to public health. See “Selected systematic review sites” at http://cbpp-pcpe.phac-aspc.gc.ca/.
Conducting Systematic Reviews

You may encounter a situation in which you are required to conduct a systematic review of all the literature on a particular topic. Systematic reviews can be quite time-consuming to complete; the average time suggested is six months of full time work, though they often take up to 12 months or more to complete. They involve searching not only PubMed, but also any other databases that are relevant to the search. Hundreds of articles are typically reviewed and evaluated. Often, manual hand-searching of journal literature and contacting of key authors is also necessary.

Systematic reviews are resource-intensive. They require a team of researchers (including epidemiologists and evaluators), full library support (for literature searching and retrieval, as you may need several hundred articles in some cases), and specialized tools (e.g. statistical software such as SPSS). Unless you have adequate resources available, it is extremely difficult to conduct a scientifically valid and methodologically sound systematic review. Public health librarians can offer expertise on literature searching aspects of systematic reviews.

For detailed information about conducting systematic reviews in public health, consult the following two excellent resources from the Cochrane Health Promotion and Public Health Field:

- Health Promotion and Public Health Systematic Review Handbook and;
- Guidelines for Health Promotion and Public Health Systematic Reviews.

The searches on the OPHS website support literature reviews which are more limited in scope than the systematic review process, but sufficient to provide evidence to support program development and implementation. This type of review tends to focus on the effectiveness of public health interventions. A simple way to retrieve review articles is to add the following qualifiers to the end of your search string:

```
(Review* OR meta analys* OR metanalys* OR metaanalys* OR pooled OR
effective* OR evaluat* OR evidence* OR efficac* OR outcome* OR impact* OR
guideline* OR best practic* OR best practis*)
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How to Obtain Articles ("Full Text")

Try one or several of the following options to access full text articles:

Option 1:  Direct Link to Online Full Text from PubMed Abstract

Although PubMed is primarily an index to the journal literature, some PubMed abstracts include a direct link to an external website which provides the full text article free of charge. When you view the abstract of an article that is of interest to you, look for an icon in the top right-hand corner of the abstract which indicates that the full text is available for free on another website. One such icon is shown in the screen shot below; the icon may look different depending on which external site provides the full text. Click on this icon to view the full text article in a new window.

Option 2:  PubMed LinkOut to PublicHealthOntario.ca Virtual Library (public health practitioners in Ontario only)

Staff in Ontario’s public health units and the Public Health Division of the Ministry of Health and Long-Term Care (MOHLTC) have access to selected full text articles via the PublicHealthOntario.ca Virtual Library. In some cases, you will be able to access the full text of an article in the Virtual Library via a direct link from the PubMed abstract. You will be asked to enter your Virtual Library username and password prior to accessing the full text.
View the abstract of an article of interest. Click on the Links icon at the top right-hand side of abstract. From the small sub-menu that appears, click on LinkOut.

You will be redirected to a page of LinkOut resources. Scan this page to see if EBSCO is listed as a full text source. If EBSCO is not listed, the article that you have chosen is not available in the Virtual Library. If EBSCO is listed in the table of full text sources, click on the Full Text link beside it.

A new window will open directing you to the full text article. You may be prompted to enter a username and password. Enter your Virtual Library login information. If you are an employee...
of an Ontario public health unit or the MOHLTC Public Health Division but do not have a Virtual Library login and password, contact your institution’s public health library to obtain this information (public health unit staff without access to an in-house library may contact beata.pach@ontario.ca or allison.mcarthur@ontario.ca for access instructions).

Option 3: Open Access Online Journals

The full text of every article published in an “open access” journal is available for free online. However, PubMed does not provide direct links to all open access journal articles.

One way to check if the journal in which your article is published provides free online content is by accessing the OPHLA Open Access Public Health e-Journals document.

Links to additional open access journal directories can be found in the OPHLA Web Search Tools document.

Option 4: Your Institution’s Library Service

Many Ontario public health units provide library services to staff. If you have access to library services through your home institution, contact library staff to inquire about retrieving full text articles.

Option 5: Single Article Purchase from the Publisher’s Website

Virtually all publishers sell electronic or print copies of individual articles via their websites. Expect to pay about $20 per article (prices vary by publisher). Publishers often offer a few free full text articles via a sample issue or other special promotion.

Search for the full name of the journal in quotation marks (e.g. “New England Journal of Medicine”) or a phrase from the title of an article (e.g. “Survival and growth of foodborne microorganisms”) to find the journal publisher’s website. Check to see if the article you want is available for free after registration or as part of a special issue. If it is not available for free, follow the publisher’s instructions for purchasing individual articles.